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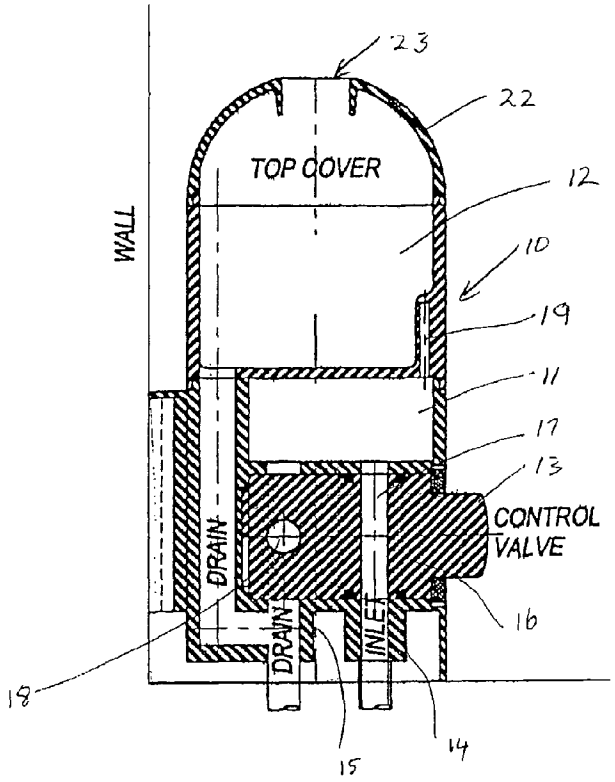
[Continued on next page]

(54) Title: METHOD AND APPARATUS FOR CLEANING AND DISINFECTING A TOOTHBRUSH



(57) Abstract: A device for rinsing or disinfecting a toothbrush including: a chamber (11, 12) for receiving a head portion of a toothbrush; an inlet (14) for supplying a liquid into the first chamber (11, 12); an outlet (15) for draining liquid from the chamber (11, 12); a control means (13) for controlling the flow of liquid into the chamber (11, 12); wherein the chamber (11, 12) is adapted such that when the head portion of a toothbrush is located in the chamber (11, 12), liquid flowing into the chamber (11, 12) is directed at the head portion.

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METHOD AND APPARATUS FOR CLEANING AND DISINFECTING A TOOTHBRUSH

Studies have shown that toothbrushes carry a large variety of bacteria and viruses that are partly responsible for illnesses such as a sore throat, gum disease, colds and the flu. The bacteria and viruses carried on a toothbrush can survive for several weeks and possibly months which may result in the infection and unfortunately, the reinfection of a person using the toothbrush, thus causing their illness to linger unnecessarily.

It has been suggested that the frequent replacement of a toothbrush may reduce the incidence of infection and reinfection, however, studies have also shown that new toothbrushes and toothbrushes that have been used once can carry infectious amounts of bacteria or viruses.

It is therefore an object of the present invention to provide a method and device for rinsing or disinfecting toothbrushes between brushing.

According to the present invention there is provided a device for rinsing or disinfecting a toothbrush, the device including:

a first chamber for receiving a head portion of a toothbrush;

an inlet for supplying a liquid into the first chamber;

an outlet for draining liquid from the first chamber; and

a control means for controlling the flow of liquid into the first chamber;

wherein the first chamber is adapted such that when the head portion of a toothbrush is located in the first chamber, liquid flowing into the first chamber is directed at the head portion.

It is preferred that the liquid be discharged into the first chamber via a plurality of outlets. It is even more preferred that the liquid be discharged into the first chamber via 4 to 7 of said outlets, and each outlet being arranged around the inside perimeter of the first chamber such that the liquid discharged from each outlet is directed at a different region of the head portion of a toothbrush. It is also preferred that the outlets be arranged at different heights within the first chamber.

It is preferred that the first chamber include:

a mixing compartment in which the liquid can be mixed with a disinfectant; and

a washing compartment that is flow connected to the mixing compartment, the washing compartment capable of receiving the head portion of the toothbrush and adapted to direct liquid flowing from the washing compartment at the head portion of the toothbrush.

Although it is possible that the liquid may be pre-mixed with a disinfectant or cleaning agent before being supplied to the device, it is preferred that the liquid be mixed with a disinfectant in the mixing compartment. However, in the event that the liquid supplied to the device be tap water, and a disinfectant is not located in the mixing compartment, the liquid flowing into the washing compartment and directed at the head portion of the toothbrush rinses the head portion and dislodges debris therefrom.

It is also preferred that the device include a second chamber in which the head portion of the toothbrush can be stored between brushing and the second chamber is capable of containing a disinfectant solution for disinfecting the head portion of the toothbrush while positioned in the second chamber.

It is preferred that the second chamber include a plurality of cylindrical compartments, each compartment capable of receiving the head portion of a toothbrush and retaining the toothbrush in an upward orientation.

It is preferred that the inlet be flow connected to the mixing compartment.

It is preferred that the outlet be flow connected to the washing compartment.

It is preferred that the control means be a two-way control valve such that when switched to the on position, liquid can flow into the mixing compartment of the first chamber, and when switched to the off position, the liquid can be drained from the washing compartment of the first chamber.

It is preferred that the control means includes a timer having means for automatically switching the control means from the on position to the off position upon exploration of a selected time period.

In the event that the head portion of the tooth brush be stored in the second chamber, it is preferred that the timer automatically switches the control means from the on position to the off position upon exploration of sufficient time for the liquid to have rinsed disinfectant or debris from the head portion of the toothbrush.

In the event that a disinfectant be placed in the mixing compartment, it is preferred that the timer automatically switches the control means from the on position to the off position upon exploration of sufficient time for the liquid to have disinfected the head portion.

It is preferred that upon switching the control means to

the on position, liquid enters and fills the mixing compartment before discharging into the washing compartment.

It is preferred that the mixing compartment includes a closeable opening that allows the disinfectant reagent to be placed inside the mixing compartment.

It is preferred that the mixing compartment, washing compartment and control means be housed in a single unit that is suitable for installation on a bench top, bathroom vanity or similar structure.

It is preferred that the disinfectant, before being mixed with the liquid in the mixing compartment be a solid such as a tablet.

It is preferred that the disinfectant reagent be a tablet of known mass and dissolves in the liquid at a known rate such that each tablet be capable of disinfecting a known number of toothbrushes.

According to the present invention there is also provided a method for rinsing or disinfecting a toothbrush using the device described above, the method including the steps of:

a) positioning a head portion of a toothbrush in the first chamber;

b) operating the control means such that liquid flowing into the first chamber and directed at the head portion occurs for a preselected time period for either applying or removing disinfectant from the head portion of the toothbrush.

It is preferred that the method also include the further step of:

storing the head portion of a toothbrush in a

disinfect while the toothbrush is not used for brushing. Two preferred embodiments of the present invention will now be described with reference to the accompanying figures, in which:

Figure 1 illustrates a front view of a device for cleaning and disinfecting a toothbrush;

Figure 2 illustrates a side view of the device shown in Figure 1;

Figure 3 illustrates a cross-section of the front view shown in Figure 1;

Figures 4 to 6 illustrate a cross-section through the planes BB, CC and DD, respectively, shown in Figure 3;

Figure 7 illustrates a cross-sectional view of the device illustrated in Figure 2; and

Figure 8 and 9 illustrate front and top views, respectively, of an alternative embodiment.

The same reference numerals have been used to identify similar and substantially identical features of the various embodiments throughout the Figures.

With reference to Figures 3 and 7, the device includes an outer housing 10 defining a chamber that is divided into a mixing compartment 11 and a washing compartment 12. Both compartments 11 and 12 are moulded from a suitable plastic material such as polypropylene. The device also includes a control valve 13.

As can be seen in Figure 7, the control valve 13 is located at the lower end of the housing 10. In particular, the control valve 13 includes an inlet 14

connected to a mains water tap, a drain outlet 15 connected to a household septic or sewerage system, and a rotatable cylindrical member 16 having first and second passageways 17 and 18 extending therethrough.

Figure 7 illustrates the control valve 13 in an open position, wherein the first passageway 17 aligns with the inlet 14 such that pressurized water flows into to the mixing compartment 11. Although not illustrated in the figures, the control valve 13 also includes a timer having means for automatically switching the control valve 13 from the on position to the off position upon exploration of a selected time period. Once the time period has expired, the cylindrical member 16 rotates 90 degrees about its horizontal axis to close the inlet 14 and align the second passageway 18 with the drainage outlet 15, thereby draining mixture from the mixing compartment 11. The control valve 13 is fitted with a suitable driving means such as a spring mechanism, that automatically switches the control valve 13 from the on position to the off position when the selected time period has expired.

When the control valve 13 is switched to the on position, tap water flows into the mixing compartment 11, and if present, mixes with the disinfectant in the mixing compartment 11. Once the air inside the mixing compartment 11 has been displaced by the mixture, and the water continues to flow into the mixing compartment 11, the mixture is forced to flow through the six passageways 19 leading from the mixing compartment 11 into the washing compartment 12. As can be seen in Figure 5, said passageways 19 leading into the washing compartment 12 are equally spaced around the inside perimeter of the washing compartment 12. Figure 3 also illustrates that the height of each passageway 19 varies so that the mixture discharged into the washing compartment 12 can be directed by spray nozzles at a specific region of the head of the toothbrush. As a person skilled in the art would

appreciate, while the control valve 13 is switched in the on position, tap water continuously flows into the mixing compartment 11 and upon filling the mixing compartment 11, the mixture continuously flows through the passageway 19 and is discharged into the washing compartment 12.

Located to one side of the control valve is a drainage channel 20 extending downwardly from a floor of the washing compartment 12 and connecting to the drainage outlet 15 of the control valve 13 such that spent mixture can be continuously discharged from the washing compartment 12.

As can be seen in Figure 8, fitted to the upper edge of the washing compartment 12 is a hemispherical translucent cover 22 having an opening 23 at its upper extremity. The head portion of a toothbrush having bristles can be passed through the opening 23 and lowered downwardly into the washing compartment 12 adjacent to the spray nozzles of the passageways 19 discharging the mixture.

A disinfectant can be in the form of any suitable liquid or solid and according to the embodiment illustrated in Figures 1 to 7 is applied to the toothbrush whilst located in the washing compartment. For example, the disinfectant may be provided of a tablet that contains active ingredients that readily dissolves in water and contains a sufficient amount of the active ingredient to clean and disinfect a number of toothbrushes. To facilitate the use of tablets, the mixing compartment 11 includes a resealable plug 21 that allows one or more fresh tablets to be placed inside the mixing compartment 11 when required.

According to the alternative preferred embodiment illustrated in Figures 8 and 9, a disinfectant solution for disinfecting the head portion of the toothbrush is

contained in a separate disinfecting chamber 24. The disinfecting chamber 24 includes 4 cylindrical compartments 25 in which the disinfectant solution can be poured. In use, a toothbrush, with the head portion pointing downwardly and the body of the toothbrush oriented upwardly, can be position and stored in one of the compartments 25 between brushing. While stored in the disinfecting chamber, the disinfectant solution disinfects the head portion. When a person wishes to brush their teeth, the brush is removed from the disinfecting chamber 24 and rinsed in a rinsing device to dislodged debris and substantially remove disinfectant from the disinfectant chamber prior to brushing. In order to rinse the toothbrush, the control valve 13 is manually switched to the on position and the timer automatically switches the control valve 13 from the on position to the off position switches upon exploration of sufficient time for the liquid to have rinsed disinfectant or debris from the head portion of the toothbrush.

The rinsing device is substantially the same as the device described and shown in Figures 1 to 7. If needed, in addition to the disinfectant chamber 24, a disinfectant or cleaning agent may also be mixed in the mixing compartment 11 of the rinsing device.

Interposed between the rinsing device and the disinfectant chamber 24 is a storage receptacle 26 for items such as toothpaste tubes.

Although not illustrated in the Figures, either embodiment can be mounted to a bench top, bathroom vanity or similar structure, wherein the inlet 14 of the control valve 13 is permanently plumbed to the mains water supply using a 6mm conduit and the drainage outlet 15 of the control valve 13 is permanently plumbed to the septic or sewerage system using a 12mm conduit.

It will be understood by persons skilled in the art of the invention that many modifications may be made without departing from the spirit of scope of the invention.

For example, the control valve of either embodiment could be in a form of any suitable ball or gate valve for regulating the flow of water into the mixing compartment.

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A device for rinsing or disinfecting a toothbrush, the device including:

a first chamber for receiving a head portion of a toothbrush;

an inlet for supplying a liquid into the first chamber;

an outlet for draining liquid from the first chamber; and

a control means for controlling the flow of liquid into the first chamber;

wherein the first chamber is adapted such that when the head portion of a toothbrush is located in the first chamber, liquid flowing into the first chamber is directed at the head portion.

2. The device according to claim 1, wherein the liquid be discharged into the first chamber via a plurality of outlets.

3. The device according to claims 1 or 2, wherein the liquid be discharged into the first chamber via 4 to 7 of said outlets, and each outlet being arranged around the inside perimeter of the first chamber such that the liquid discharged from each outlet is directed at a different region of the head portion of a toothbrush.

4. The device according to claims 2 or 3, wherein the outlets be arranged at different heights within the first chamber.

5. The device according to any one of the preceding claims, wherein the first chamber include:

a mixing compartment in which the liquid can be mixed with a disinfectant; and

a washing compartment that is flow connected to

the mixing compartment, the washing compartment capable of receiving the head portion of the toothbrush and adapted to direct liquid flowing from the washing compartment at the head portion of the toothbrush.

6. The device according to any one of the preceding claims including a second chamber in which the head portion of the toothbrush can be stored and the second chamber is capable of containing a disinfectant solution for disinfecting the head portion of the toothbrush while positioned in the second chamber.

7. The device according to claim 6, wherein the second chamber includes a plurality of cylindrical compartments, each compartment capable of receiving the head portion of a toothbrush and retaining the toothbrush in an upward orientation.

8. The device according to any one of the preceding claims, wherein the control means includes a timer having means for automatically switching the control means from the on position to the off position upon exploration of a selected time period.

9. The device according to claim 8, wherein when the head portion of the tooth brush is stored in the second chamber, the timer automatically switches the control means from the on position to the off position upon exploration of sufficient time for the liquid to have rinsed disinfectant or debris from the head portion of the toothbrush.

10. The device according to claim 8, wherein when a disinfectant is placed in the mixing compartment, the timer automatically switches the control means from the on position to the off position upon exploration of sufficient time for the liquid to have disinfected the

head portion.

11. The device according to any one of claims 5 to 10, wherein the control means is a two-way control valve such that when switched to the on position, liquid can flow into the mixing compartment of the first chamber, and when switched to the off position, the liquid can be drained from the washing compartment of the first chamber.

12. The device according to claim 11, wherein upon switching the control means to the on position, liquid enters and fills the mixing compartment before discharging into the washing compartment.

13. The device according to claim 12, wherein the mixing compartment, washing compartment and control means be housed in a single unit that is suitable for installation on a bench top, bathroom vanity or similar structure.

14. The device according to claim 12, wherein the disinfectant, before being mixed with the liquid in the mixing compartment be a solid such as a tablet.

15. A method for rinsing or disinfecting a toothbrush using the device according to any one of the preceding claims, the method including the steps of:

a) positioning a head portion of a toothbrush in the first chamber;

b) operating the control means such that liquid flowing into the first chamber and directed at the head portion of the toothbrush occurs for a preselected time period for either applying or removing disinfectant from the head portion of the toothbrush.

16. The method according to claim 15, further including the step of:

storing the head portion of a toothbrush in a disinfect while the toothbrush is not used for brushing.

FIGURE 1

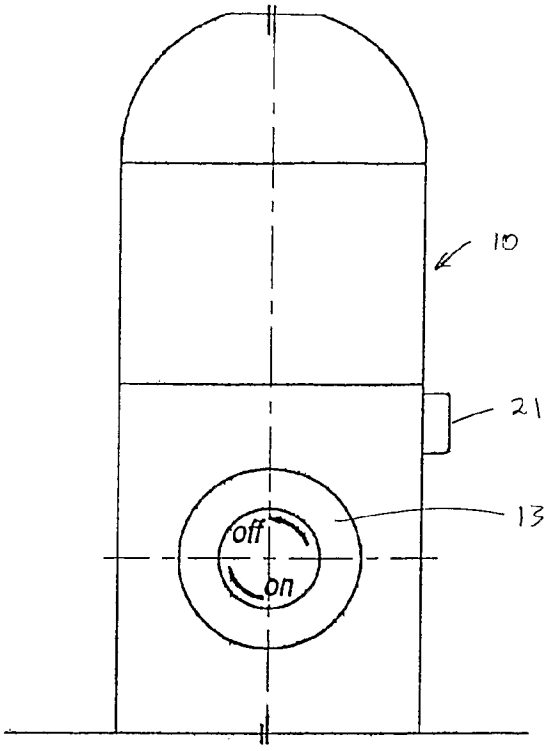


FIGURE 2

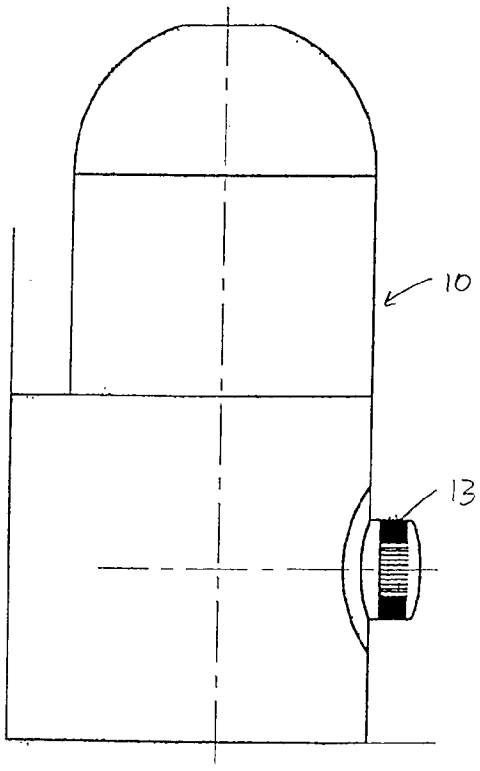


FIGURE 3

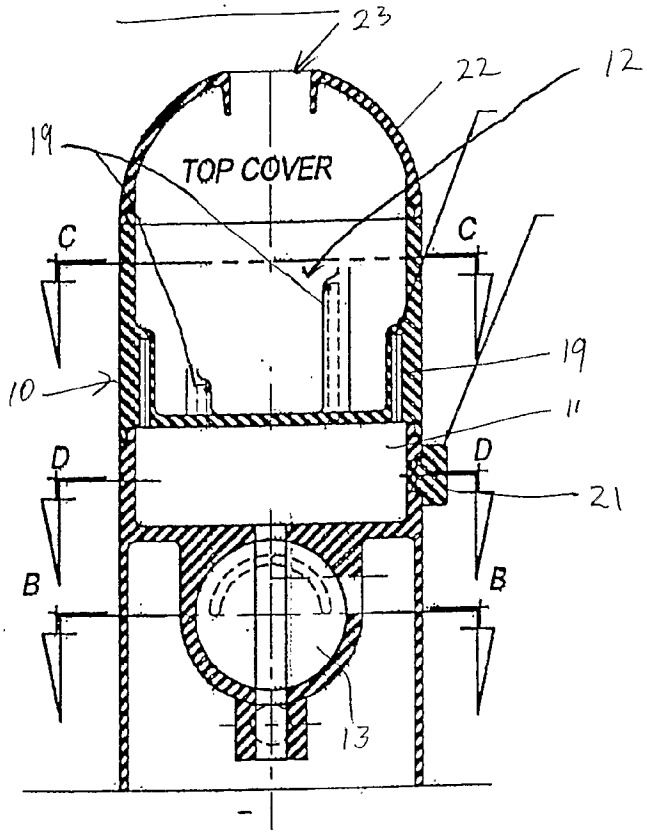


FIGURE 4

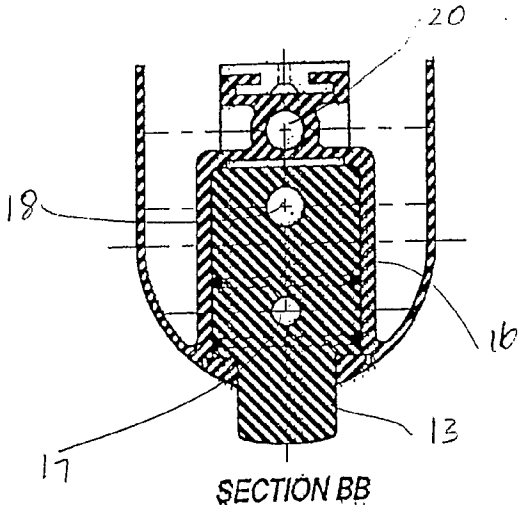


FIGURE 5

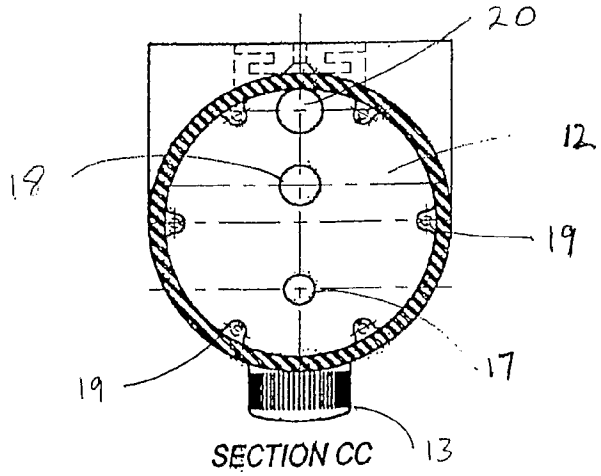


FIGURE 6

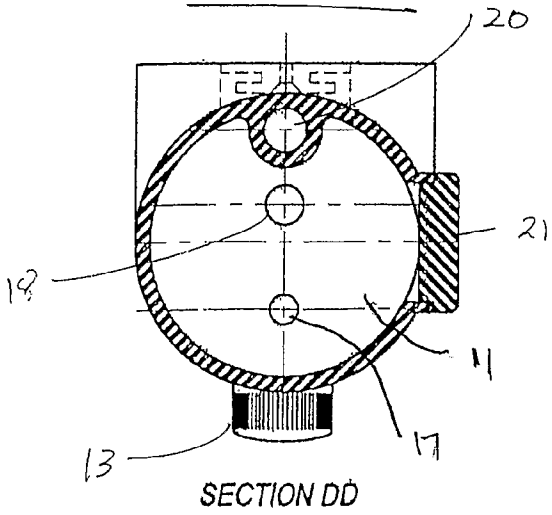


FIGURE 7

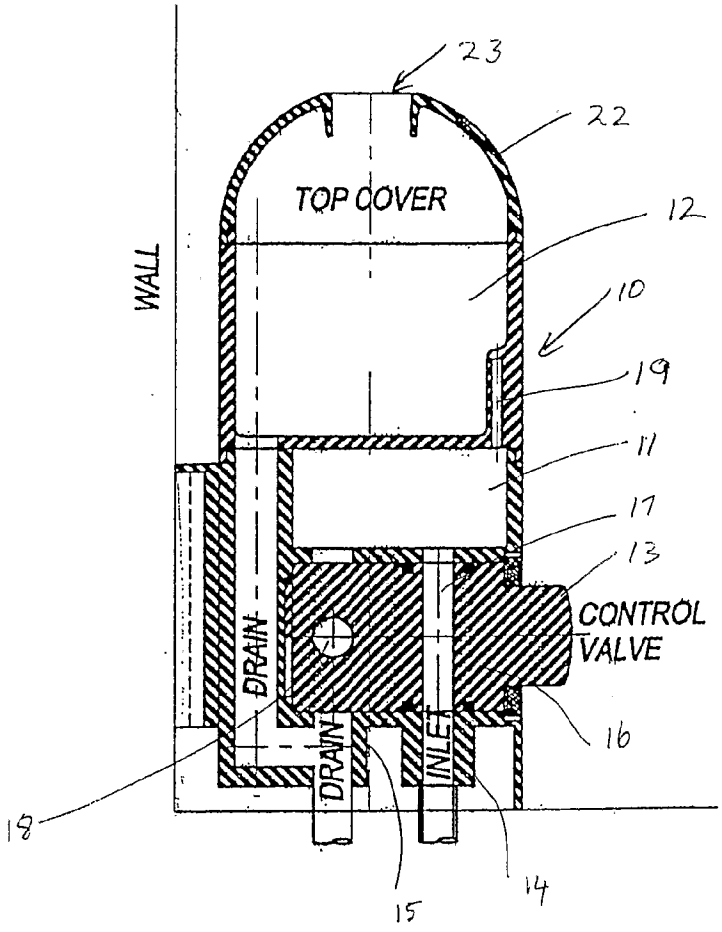

23
22
TOP COVER
12
WALL
10
19
11
17
13
CONTROL VALVE
DRAIN
DRAIN
INLET
16
18
15
14

Figure 8

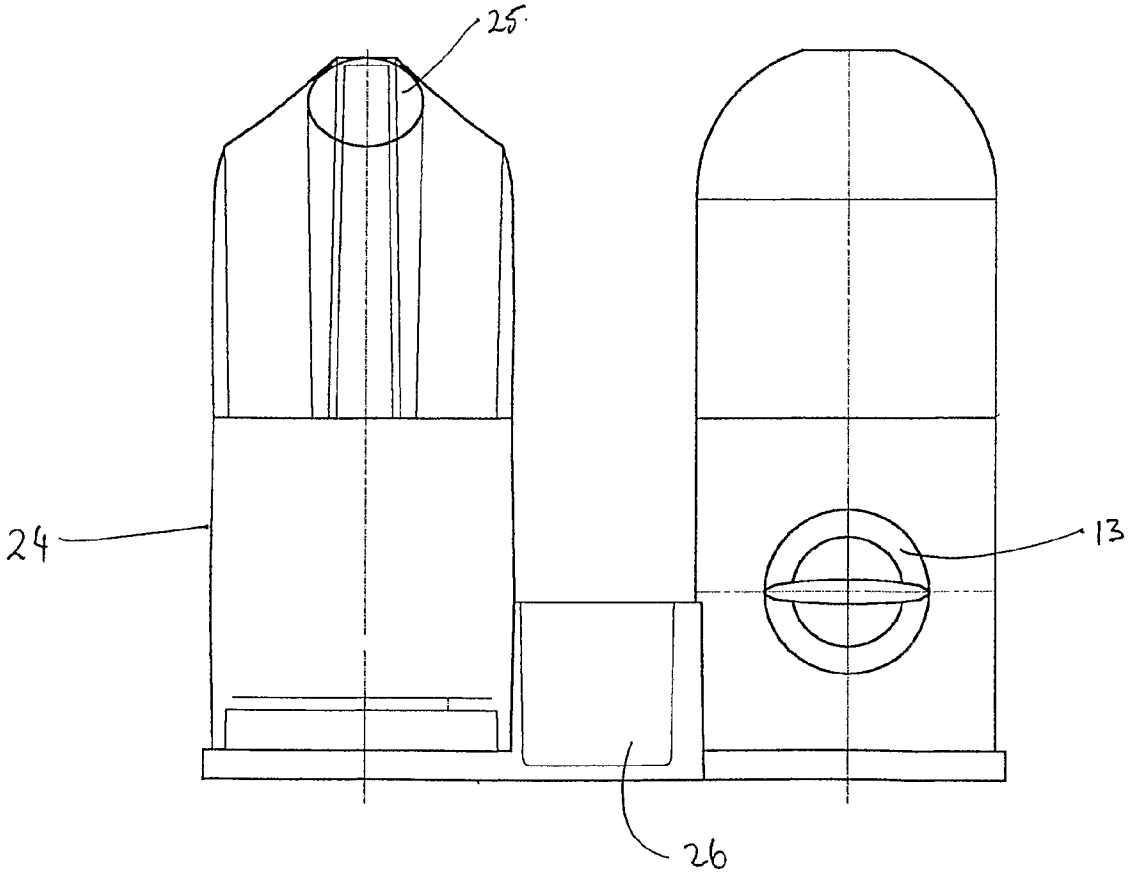
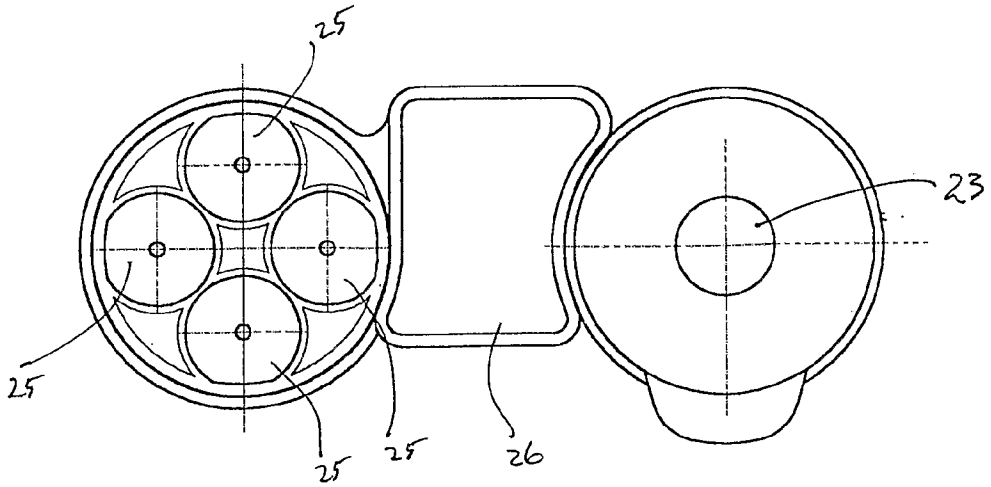


Figure 9



INTERNATIONAL SEARCH REPORT

International application No.
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A. CLASSIFICATION OF SUBJECT MATTER

Int. Cl. [7]: A46B 17/06

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
AU: IPC: A46B 17/06 (all); A47K 1/09 (PAIS only)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Derwent World Patent Index: brush, toothbrush, tooth, teeth, denture, clean, rinse, wash, sterilise, inlet, outlet, supply, drain

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5882613 A (GIPSON, II) 16 March 1999 See figure 2	1-4, 15, 16
A	US 4891857 A (PINSONNEAULT) 9 January 1990 Whole document	1-16
A	DE 19606136 A1 (GRUBER) 21 August 1997 Whole document	1-16

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
8 November 2002	25 NOV 2002
Name and mailing address of the ISA/AU	Authorized officer
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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/AU02/01424

This Annex lists the known "A" publication level patent family members relating to the patent documents cited in the above-mentioned international search report. The Australian Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

Patent Document Cited in Search Report		Patent Family Member					
US	5882613	NONE					
US	4891857	CA	1269026				
DE	19606136	NONE					
							END OF ANNEX